


TEXAS COMMISSION ON ENVIRONMENTAL QUALITY  
PINE ISLAND BAYOU  
CONTINUOUS WATER QUALITY MONITORING  
PROJECT PLAN

A1 APPROVAL PAGE

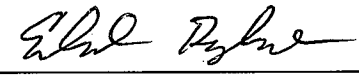
Texas Commission on Environmental Quality Central Office

  
Charles Dvorsky  
CWQMN Network Coordinator, TCEQ

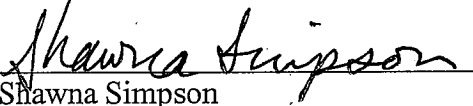
3/6/08  
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Patrick Roques  
Section Manager, TCEQ WQM&A Program

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CWQMN Quality Control Officer

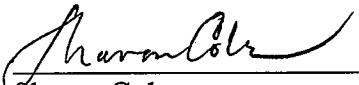
3/17/08  
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Shawna Simpson  
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Brenda Archer  
Team Leader, TCEQ SWQM Program

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Sharon Coleman  
CWQMN Quality Assurance Officer


3/13/2008  
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David Manis  
Section Manager, TCEQ DM&QA

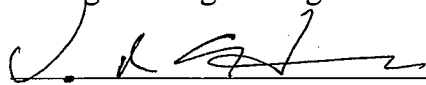
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**A1 APPROVAL PAGE**

**The Lower Neches Valley Authority (LNVA)**

  
\_\_\_\_\_  
Dawn Pilcher, P.E.  
Manager of Engineering

11 MAR 2008  
Date

  
\_\_\_\_\_  
David Hancock, Environmental Supervisor  
CRP Project Manager/Site Operator

3/11/08  
Date

This Project Plan documents specific details for a new continuous water quality monitoring project not covered in the Continuous Water Quality Monitoring Network (CWQMN) Quality Assurance Project Plan. Please see the CWQMN QAPP for other network details.

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## LIST OF ACRONYMS

<b>CAMS</b>	<b>Continuous Ambient Monitoring Station</b>
<b>CVS</b>	<b>Calibration Verification Sample</b>
<b>CWQMN</b>	<b>Continuous Water Quality Monitoring Network</b>
<b>DO</b>	<b>Dissolved Oxygen</b>
<b>DM&amp;QA</b>	<b>Data Management and Quality Assurance</b>
<b>DQO</b>	<b>Data Quality Objective</b>
<b>FOD</b>	<b>Field Operations Division</b>
<b>mg/L</b>	<b>Milligram per Liter</b>
<b>LEADS</b>	<b>Leading Environmental Analysis and Display System</b>
<b>MOPs</b>	<b>Monitoring Operation Division</b>
<b>MQO</b>	<b>Measurement Quality Objective</b>
<b>NA</b>	<b>Not Applicable</b>
<b>NIST</b>	<b>National Institute of Standards and Technology</b>
<b>PMA</b>	<b>Preventative Maintenance Code</b>
<b>QA</b>	<b>Quality Assurance</b>
<b>QAO</b>	<b>Quality Assurance Officer</b>
<b>QAPP</b>	<b>Quality Assurance Project Plan</b>
<b>QC</b>	<b>Quality Control</b>
<b>SC</b>	<b>Specific Conductance</b>
<b>SOP</b>	<b>Standard Operating Procedure</b>
<b>SWQM</b>	<b>Surface Water Quality Monitoring Team</b>
<b>T</b>	<b>Temperature</b>
<b>TBD</b>	<b>To Be Determined</b>
<b>TCEQ</b>	<b>Texas Commission on Environmental Quality</b>
<b>TPWD</b>	<b>Texas Parks and Wildlife</b>
<b>µS/cm</b>	<b>micro Siemens per centimeter</b>
<b>WQM&amp;A</b>	<b>Water Quality Monitoring &amp; Assessment Section</b>

## A3 DISTRIBUTION LIST

**TEXAS COMMISSION ON ENVIRONMENTAL QUALITY REGION 10 BEAUMONT  
REGIONAL OFFICE  
MC-R10**

Ms. Georgie Volz, Regional Director, (409) 898-3838  
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Mr. Charles Dvorsky, Network Coordinator, Ambient Monitoring Section, Monitoring Operations Division, (512) 239-5550

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Ms. Brenda Archer, Surface Water Quality Monitoring Team Leader, Monitoring Operations Division

Ms. Gail Rothe, Categorical 106 Grant Project Manager

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Mr. Robert Stroder, P.E., General Manager, (409) 892-4011

Ms. Dawn Pilcher, P.E., Manager of Engineering, (409) 892-4011

Mr. David Hancock, Clean Rivers Project Manager (409) 898-0561, ext 2

## **A4 PROJECT/TASK ORGANIZATION**

This section is intended to identify individuals and organizations that will be responsible for developing and/or supporting this CWQMN project. For a list of additional project/task and responsibilities please refer to section A4 of the CWQMN QAPP.

### **A4.1 TCEQ Network Coordinator (Charles Dvorsky)**

- Provides overall support for coordination, development, and installation of new Continuous Ambient Monitoring Station (CAMS).
- Responsible for ensuring external data customers have access to TCEQ data behind firewall.

### **A4.2 TCEQ Project Lead (Shawna Simpson)**

- Responsible for writing Project Plan.
- Responsible for site selection.
- Responsible for monitoring equipment purchases.
- Participate in station deployment.
- Provide operation and maintenance supplies to site operator when requested.
- Provide assistance to site operator, QC officer, and data validator to resolve data quality problems as needed.

### **A4.3 Lower Neches Valley Authority (LNVA) (David Hancock)**

- Responsible for site operation.
- Responsible for water quality monitoring equipment quality control activities.
- Participate in site deployment.
- Communicate equipment needs for operation and maintenance of site to project lead.
- Data customer.
- Provides feedback to TCEQ for specific data needs.

### **A4.4 TCEQ Ambient Monitoring (Lloyd Lawrence)**

- Responsible for site communication.
- Participate in site deployment.

### **A4.5 TCEQ Data Validation (Tabitha Kirkland)**

- Responsible for validation of site data record.

#### **A4.6 TCEQ Continuous Water Quality Monitoring Quality Control Officer (Ed Ragsdale)**

- Provides QC oversight of project.
- Reviews and comments on proposed project plan.

#### **A5 PROBLEM DEFINITION/BACKGROUND**

Pine Island Bayou has been listed on the 303(d) list for depressed dissolved oxygen (DO) since 1996 and is currently categorized as a 5b water body and is therefore under review for determining the appropriate DO standard criteria. To that end, a Use Attainment Assessment (UAA) was initiated in September 2005. Hurricanes, heavy rain and flooding have postponed several scheduled trips to Pine Island Bayou since sampling began. Biological sampling for the UAA has been tentatively rescheduled for March, 2008.

Additionally, the Lower Neches Valley Authority (LNVA) occasionally diverts water from Pine Island Bayou, upstream of the Highway 69 Bridge, to supply freshwater for municipal, agricultural and industrial consumers. LNVA staff need to determine the water quality status at Pine Island Bayou prior to diverting water into the LNVA canal.

#### **A6 PROJECT/TASK DESCRIPTION**

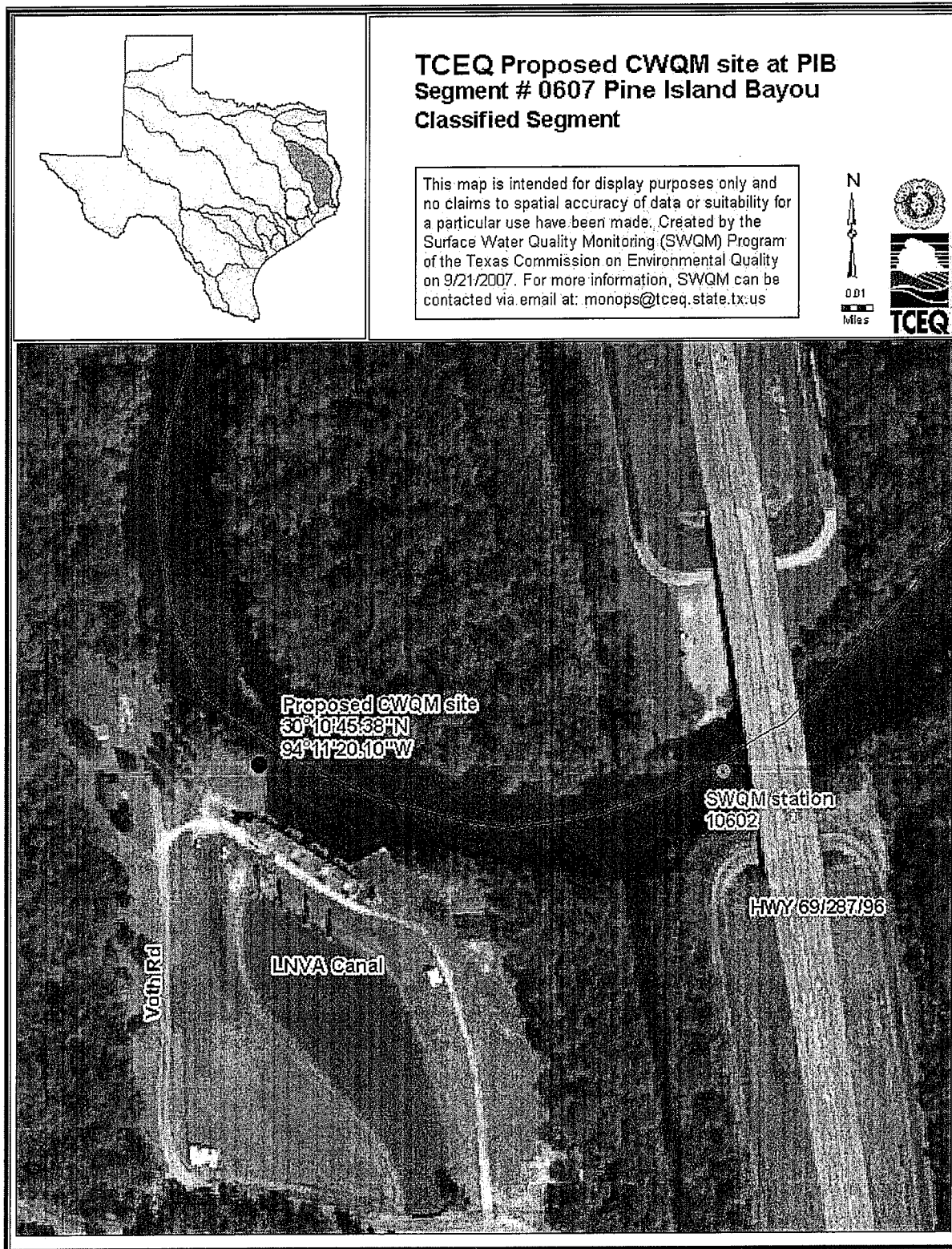
LNVA has agreed to operate a CWQMN site mounted on their structure so that they may use the data collected for management decisions. Declining water quality would alert LNVA staff that they should not operate their lift stations to divert water from Pine Island Bayou until water quality has improved. Continuously collected water quality data would be instrumental in making these management decisions. Additionally, the data collected from a CWQMN site at that location should also prove useful to TCEQ staff analyzing data for the UAA, standard criteria determination, as well as the 305 (b) CWA Assessment.

TCEQ will deploy a Continuous Ambient Monitoring Station (CAMS) number 0749 on Pine Island Bayou (PIB) on the LNVA platform. Location information is depicted on Figures 2 & 3. Deployment will take place early 2008 and continue indefinitely, or until TCEQ and/or LNVA decide data collection from this station is no longer necessary for research or management purposes. CAMS measurement equipment will include a Yellow Springs Instruments (YSI) Model 6600 multiprobe sonde mounted on the LNVA platform structure near the USGS gage station. The YSI multiprobe will measure depth, dissolved oxygen (DO), pH, temperature, specific conductance (SC), and *in-situ* turbidity (not to be used for compliance purposes).

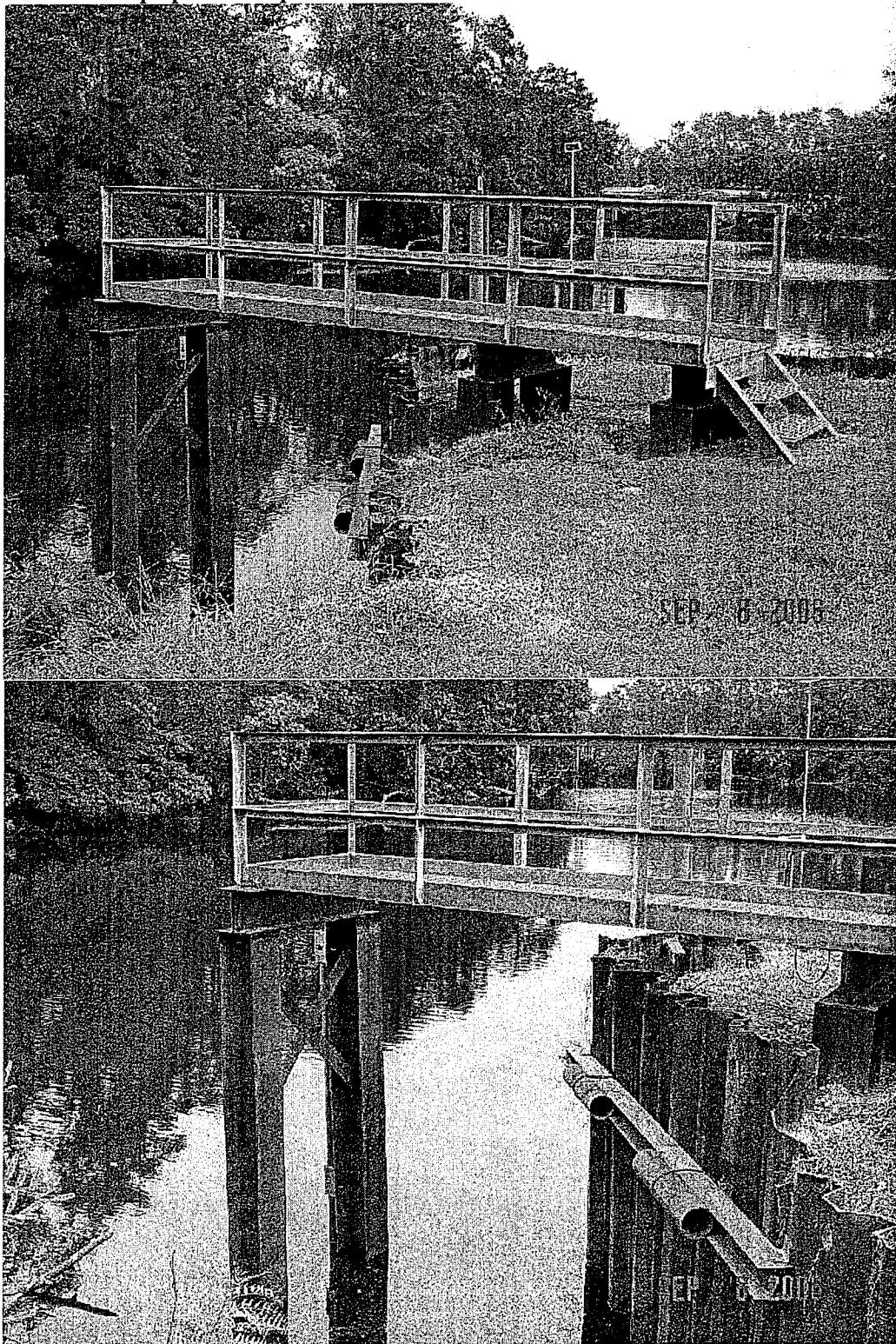
Work products discussed in this Project Plan are: CAMS station design, deployment, and operation; and data access for LNVA staff data customers. Deliverables for this project include the station data record, with a completeness goal of 75% (not to include turbidity).



Figure 1: Map of Continuous Monitoring Station Location



**Figure 2: Photos of LNVA structure where Pine Island Bayou Continuous Monitoring equipment is planned to be mounted.**



## A7 QUALITY OBJECTIVES AND CRITERIA

Methods used for the YSI multiprobe are based on *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> Edition, 1998, and *Luminescence of Dissolved Oxygen in Water and Wastewater*, Hach Method 10360, 2006.

The measurement performance specifications to support the project objectives are specified in Table A7.1.

Methods for the YSI 6600 are based on *Standard Methods for the Examination of Water and Wastewater*, 20<sup>th</sup> Edition, 1998 unless otherwise noted.

**Table A7.1 – YSI Sonde (Multi-Probe) Data Quality Objectives**

Parameter	Parameter Code	Units	Method	Calibration Verification Sample (CVS)
pH	10400	pH / units	Glass electrode, Standard Method 4500-H+B	±0.50 pH unit
Dissolved Oxygen	10300	mg/L	Luminescence, Hach Method 10360	% Saturation ≤ 6.0% ±0.50 mg/L
Specific Conductance	10094	µS/cm	Conductivity cell Standard Method 2520B	≤ 5.0% RPE
Temperature	10010	°C	Standard Method 2550 B	± 0.5°C
Turbidity	10104	NTU	NA	NA

### Ambient Water Reporting Limits (AWRLs)

NA.

### Precision

NA.

### Bias

As described in Section A7.4 of the CWQMN QAPP for DO, SC, and pH. TCEQ has not established criteria to assess turbidity sensor drift and accuracy.

### Representativeness

As described in Section B2 of the CWQMN QAPP.

## **Comparability**

As described in Section B2 of the CWQMN QAPP for DO, SC, and pH.

## **Completeness**

A general requirement of 75 percent data completeness goal has been set for the CWQM network. Periods of flood or other conditions that necessitate the shutdown of any or all instrumentation during these times are not considered in the calculation for data completeness. See Section A7.5 CWQMN QAPP. Turbidity data are not included in data completeness determination.

## **A8 SPECIAL TRAINING/CERTIFICATION**

As described in section A8 of the CWQMN QAPP.

## **A9 DOCUMENTS AND RECORDS**

As described in section A9 of the CWQMN QAPP.

## **B1 SAMPLING PROCESS DESIGN**

### **Site Selection Criteria**

The LNVA platform site was chosen based on the following criteria:

- Existing structure provides easy physical access to monitoring equipment as well as existing power supply.
- Location allows the LNVA staff to use data collected for making management decisions, specifically by determining if water from Pine Island Bayou is of sufficient quality to divert to the LNVA canal.
- Location is near existing SWQM routine monitoring station 10602. Data collected from routine sampling and CWQMN sampling can be analyzed to determine if data collected at the CWQMN site is comparable to routine data and representative of the ambient conditions and may be included in future 305 (b) CWA Assessments.
- All Assessment Units of Pine Island Bayou are currently listed on the DRAFT 2006 Texas 303 (d) List for depressed dissolved oxygen, therefore, a CWQMN site at this location could assist with characterizing the DO diel variability and could be included in the UAA.

## **Monitoring Station Design**

### Monitoring and Support Equipment

The CAMS site will include the following monitoring and support equipment;

- Two YSI 6600V2 Multiprobes and associated cables.
- data logger
- Wireless cellular modem
- Backup power supply
- Sonde housing apparatus and other equipment necessary for secure attachment to existing LNVA structure.

### Monitoring Equipment Configurations and Measurement Frequencies

The YSI multiprobe will be configured to measure surface water parameters, taking water quality measurements at approximately 1.0 meter depth, once every 15 minutes and then hourly averages are calculated and posted on the internal website. The multiprobe will measure sample depth, DO, pH, specific conductance, temperature, and turbidity. Data collected will be transmitted via wireless modem (or land line if possible) once per hour or every 15 minutes, depending on preference of the site operator.

## **B2 SAMPLING METHODS**

As described in section B2 of the CWQMN QAPP.

### **Sampling/Measurement System Corrective Action**

As described in section B2.2 of the CWQMN QAPP.

## **B3 SAMPLE HANDLING AND CUSTODY**

As described in Section B3 of the CWQMN QAPP.

## **B4 ANALYTICAL METHODS**

Analytical methods are listed in Section A.7.1

## **B5 QUALITY CONTROL**

Quality control procedures are described in Section B5 of the CWQMN QAPP.

Please see Table A7.1 for sonde multiprobe QC criteria.

#### YSI Model 6600 Multiprobe SC, pH, and Sample Depth Sensors

For QC procedures please see SOP AMPM – 11: *Analysis of Dissolved Oxygen (DO), Specific Conductance (SC), pH, Temperature, and Sample Depth in Ambient Surface Water Using Yellow Springs Instrument (YSI) 600 XLM and 6600 Extended Deployment System (EDS) Sonde*, TCEQ June 2006.

#### YSI Model 6600 Optical DO Sensor

A specific SOP for the QC of Optical DO sensors using the Luminescence Hach Method 10360 has not been developed by TCEQ. Site Operator should follow QC procedures described in the *6-Series Multiparameter Water Quality Sondes User Manual*, Version D, Yellow Springs Instruments, October 2006.

#### YSI Model 6600 Turbidity Sensor

A specific SOP for the QC of turbidity sensors using the YSI 100 NTU standard calibrant product (6073) has not been developed by TCEQ. Site Operator should follow QC procedures described in the *6-Series Multiparameter Water Quality Sondes User Manual*, Version D, Yellow Springs Instruments, October 2006. *In-situ* turbidity data collected do not comply with EPA-approved methodology. Laboratory instruments such as the Hach 2100AN, which use a tungsten lamp instead of a near infrared LED, complies with EPA methodology when the samples are diluted below 40 NTUs. The purpose of collecting turbidity data at Pine Island Bayou is to determine the turbidity levels prior to diverting water into the LNVA canal, not for any kind of compliance determinations.

QC procedures should be performed with a minimum frequency of once per month, or greater to achieve the goal of 75 percent capture of valid station data. Since turbidity data are not validated by TCEQ these data will not be included in percent data capture determination.

**CWQM QAPP, SOPs, and CWQMN Project Plans are posted on the web at:**

[http://www.tceq.state.tx.us/assets/public/compliance/monops/water/wqm/tx\\_realtime\\_swf.html](http://www.tceq.state.tx.us/assets/public/compliance/monops/water/wqm/tx_realtime_swf.html)

#### **Corrective Action Related to Quality Control**

As described in Section B5 of the CWQMN QAPP.

#### **B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE**

As described in Section B6 of the CWQMN QAPP.

## **B7 INSTRUMENT CALIBRATION AND FREQUENCY**

### YSI Model 6600 Multiprobe SC, pH, and Sample Depth Sensors

Calibrations of specific conductance, pH, and sample depth will be performed according to SOP AMPM-11: Analysis of Dissolved Oxygen (DO), Specific Conductance (SC), pH, Temperature, and Sample Depth in Ambient Surface Water Using Yellow Springs Instrument (YSI) 600 XLM and 6600 Extended Deployment System (EDS) Sonde, TCEQ June 2006.

### YSI Model 6600 Multiprobe Optical DO Sensor

An SOP for the calibration of Optical DO sensors using the Luminescence Hach Method 10360 has not been developed by TCEQ. Site Operator should follow procedures described in the 6-Series Multiparameter Water Quality Sondes User Manual, Version D, Yellow Springs Instruments, October 2006.

### YSI Model 6600 Turbidity Sensor

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All YSI multiprobe sensors should be calibrated with a minimum frequency of once per month, or greater to achieve the goal of 75 percent capture of valid station data. Since turbidity data are not validated by TCEQ these data will not be included in percent data capture determination.

## **B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES**

MOPs ambient monitoring section keeps an inventory of common spare parts. The Project lead will be responsible for the coordination of parts replacement. Calibration standards are available to the site operator through TCEQ general supply.

## **B9 NON-DIRECT MEASUREMENTS**

There are no non-direct measurements used in this project.

## **B10 DATA MANAGEMENT**

A dedicated computer maintained at the TCEQ Central Office will poll CAMS 0749 at hourly intervals. The data record is then de-coded and processed into the RHONE database where it can be accessed by internal and external parties with access behind the TCEQ firewall.

David Hancock at LNVA and/or designee will have access to view CAMS 0749 data behind the TCEQ firewall.

Other data management procedures as described in Section B10 of the CWQMN QAPP.

## **C1 ASSESSMENTS AND RESPONSE ACTIONS**

As described in CWQMN QAPP.

### **Corrective Action**

As described in Section C1 of the CWQMN QAPP.

## **C2 REPORTS TO MANAGEMENT**

As described in Section C2 of the CWQMN QAPP.

### **Reports to TCEQ Project Management**

As described in Section C2 of the CWQMN QAPP.

## **D1 DATA REVIEW, VERIFICATION, AND VALIDATION**

### **YSI Multiprobe**

#### Data Review and Verification

As described in Section D1 of the CWQMN QAPP

#### Station Data Record Validation

The station's data record will be validated based on calibration verification sample (CVS) results to be determined within 24 hours of sonde retrieval from the field. CVS criteria are described in table A7.1 of this project plan. If criteria are not met, then data collected back to the last calibration are qualified as invalid. All data within one hour after any preventative maintenance will also be qualified as invalid, in order for the sonde to stabilize.



Validation methods as performed by assigned TCEQ data validator and described in Section D2 of the CWQMN QAPP.

### **Meteorological Data**

No meteorological data are scheduled to be collected at Pine Island Bayou CWQMN site at this time.

## **D2 VERIFICATION AND VALIDATION METHODS**

As described in Section D2 of the CWQMN QAPP with the exception of the turbidity data. These data are not validated as part of the project due to the absence of data quality objectives.

## **D3 RECONCILIATION WITH USER REQUIREMENTS**

As described in Section D3 of the CWQMN QAPP.

## **D4 LITERATURE CITED**

TCEQ. SOP AMPM – 11: Analysis of Dissolved Oxygen (DO), Specific Conductance (SC), pH, Temperature, and Sample Depth in Ambient Surface Water Using Yellow Springs Instrument (YSI) 600 XLM and 6600 Extended Deployment System (EDS) Sonde, TCEQ June 2006.

YSI. 6-Series Multiparameter Water Quality Sondes User Manual, Version D, Yellow Springs Instruments, October 2006.